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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 26078-2010

**Metallic materials - Welding residual stresses - Method with
explosion treatment**

金属材料 焊接残余应力 爆炸处理法

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Foreword

Appendix A of this standard is a normative appendix. The standard proposed by China Iron and Steel Association. This standard is under the jurisdiction of the National Steel Standardization Technical Committee. This standard was drafted. Wuhan Iron and Steel (Group) Corporation, Institute of Metal Research, Shenyang Consumers should Blasting Engineering Co., Ltd. The main drafters of this standard. IRON Chen Huaining, Tan Shengyu, Zhuying Ping, Zhu Hongchuan, Qiubao Wen coated should macros.

Welding residual stress in a wide variety of welding structure, high tensile welding residual stress on long-term safety of welded structures service Performance is often adversely affected. The root causes of welding residual stress of welded joints between metal region (including weld and heat affected zone) and the base metal due to the temperature Nonconforming strain degree difference generated, so any process to eliminate welding residual stress of welded joints are to make this region a non-coordinated deformation To change the direction of coordination, such as welded joints region plastically elongate or shorten the matrix plastically. Explosive treatment method is a typical By mechanical deformation method to eliminate welding residual stress type of technology. Not only could well eliminate welding residual stress by members of the explosion shock wave energy generated in the process, usually also In order to improve various mechanical properties of the material being processed. Explosive treatment method is suitable for a variety of engineering components to eliminate the stress of demand, especially suitable for large Medium-sized steel structure, as well as structural components made of dissimilar welded joints or stainless steel material. By staging the weld, multiple batches explosion treatment, To facilitate the solution to long and medium-sized structure of a total or partial weld stress relief treatment. Metallic materials welding residual stress Explosive approach Important

Note. This standard does not point out all possible security issues. The user's responsibility to take appropriate safety and health practices and security Certified to comply with the conditions relevant state regulations.

1 Scope

China's national standard for the relief of welding residual stresses by explosion treatment.

It specifies the principle, the equipment, the procedure, the safety requirements and the verification of the method in which a controlled explosive charge is detonated along a weld to reduce the residual stress left by welding. Every weld leaves residual stress behind, because the metal that solidified last contracted while restrained by metal that had already cooled. The result is tension at the weld approaching the yield strength of the material, and it causes distortion, stress corrosion cracking, and fatigue lives shorter than the design assumed. The conventional cure is thermal: heat the assembly to a few hundred degrees and hold it, letting the material creep the stress away. That works, but it needs a furnace big enough for the workpiece, and for a large pressure vessel, a ship section, a bridge girder or a repair welded in the field there is no such furnace. Explosion treatment does the same job mechanically and locally. A thin explosive charge is laid along the weld and detonated, and the shock wave passing through the material produces a brief, very high dynamic stress that combines with the residual stress and drives local plastic deformation - which relaxes the tension without heating the assembly, without changing the microstructure, and in the open air. What the standard has to control is the dose. Too little charge does nothing; too much damages the surface, work-hardens the material or initiates cracking. So the charge type, the thickness, the standoff, the layout relative to the weld and the number of passes are specified against the material and section, together with the before and after measurement of the residual stress, and the safety of handling and detonating explosives on a fabricated structure. Issued on 10 January 2011 and in force since 1 October 2011.

This standard specifies the use of explosive welding residual stress treatment method to eliminate the principle of assessment to determine the processing parameters of the explosion, the explosion of the treatment effect Price, construction work and related security matters. This standard applies to a thickness greater than 5mm, the yield strength of not more than 900MPa, welding quality standards, good ductility ($A > 10\%$) After welding of metallic materials welded components to eliminate residual stress treatment.

2 Normative references

The following documents for the application of this document is essential. For dated references, only the dated version suitable for use herein Member. For undated references, the latest edition (including any amendments) applies to this document.

GB 6722 Blasting Safety Regulations

GB 8031 Industrial electric detonator

GB 9786 general detonating cord GB 19417 Detonator

GB/T 24179 metallic materials - Determination of indentation residual stress-strain method
ASTME837 Standard Test Method for Determination of Residual Stress drilling strain gage method

3 Terms and Definitions

The following terms and definitions apply to this standard.

3.1 Residual elastic strain *residualelasticstrain epsilon_r* The residue produced by the welding in welded joints of elastic strain.

3.2 The total plastic strain *totalplasticstrain epsilon_p* After the explosion process eventually produce plastic strain in metal.

3.3 Shock-induced plastic strain *plasticstraininducedbysockwaves* In shock induced plastic strain of metal production.

3.4 Residual stress *remainedstress* Metal stress remaining after the explosion process. * * *